From: Air.Pollution Control
To: APC Permitting
Subject: FW: Permit Application
Date: Tuesday, January 14, 2020 2:19:19 PM
Attachments: 01 VES Form APC 100-102 et al.pdf

From: stephen scott [mailto:stephen.scott@res-ses.com]
Sent: Tuesday, January 14, 2020 2:01 PM
To: Air.Pollution Control
Cc: Lloyd Lipman; John Fuss
Subject: [EXTERNAL] Permit Application

Thank You,

Stephen Scott
President
Volunteer Environmental Services
228-701-9996

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
312 Rosa L. Parks Avenue, 15th Floor, Nashville, TN 37243
Telephone: (615) 532-0554, Email: Air.Pollution.Control@TN.gov

NON-TITLE V PERMIT APPLICATION
FACILITY IDENTIFICATION

Type or print and submit. Attach appropriate source description forms.

SITE INFORMATION

1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)]
Volunteer Environmental Services, LLC #001059764

2. Site name (if different from legal name)
Covington Waste Water Treatment Plant

3. Is a construction permit application fee being submitted? (see instructions for appropriate fee to submit) Yes [✓] No [ ]

4. Site address (St./Rd./Hwy.)		County name
298 Witherington Drive		Tipton
City	Zip code	**5.** NAICS or SIC code
Covington, TN	38019	221117

6. Site location (in lat. /long.)	Latitude	Longitude
	35.620247 decimal degrees	-89.611795 decimal degrees

CONTACT INFORMATION (RESPONSIBLE PERSON)

7. Responsible person/Authorized contact			Phone number with area code
Stephen Scott			228-220-0452
Mailing address (St./Rd./Hwy.)			Fax number with area code
549 East Pass Road, STE F			228-701-9327
City	State	Zip code	Email address
Gulfport	MS	39507	Stephen.Scott@res-ses.com

CONTACT INFORMATION (TECHNICAL)

8. Principal technical contact			Phone number with area code
John Wilson			601-506-7646
Mailing address (St./Rd./Hwy.)			Fax number with area code
549 East Pass Road, STE F			
City	State	Zip code	Email address
Gulfport	MS	39507	jnokw@comcast.net

CONTACT INFORMATION (BILLING)

9. Billing contact			Phone number with area code
Stephen Scott			228-701-9996
Mailing address (St./Rd./Hwy.)			Fax number with area code
549 East Pass Road, STE F			
City	State	Zip code	Email address
Gulfport	MS	39507	Stephen.Scott@res-ses.com

AIR CONTAMINANT SOURCE(S) INFORMATION

10. Description of air contaminant source(s) and Unique Source ID(s). List, identify, and briefly describe process emission sources, fuel burning installations, and incinerators that are contained in this application and include a Unique Source ID for each source. The Unique Source ID is a name/number/letter, which uniquely identifies the air contaminant source(s), like Boiler #1, Paint Line #1, Engine #1, etc. (see instructions for more details)

This application is to replace existing permit #072620 to reflect a change in the permit holder from the City of Covington to Volunteer Environmental Services, LLC and change the biomass fuel stock.

We are applying to use medical waste and pharmaceuticals as the feed stock to the existing gasifing unit now under permit #072620.

Flue gas from a gasifier/thermal oxidizer process (Gasifier GS-200). The feedstock to the gasifier is 80-100% Medical waste and 0-20% Pharmaceutical waste. The fuel gas exiting the gasifier passes through a cyclone and then is fully oxidized in a thermal oxidizer (>1,500°F, <2 sec. residence time). Heat from the hot flue is extracted into hot oil, which is used drive an organic Rankine Cycle (ORC) electrical generator. The cooled flue gas then passes through a second heat exchanger where it is cooled to under 300°F before it is vented to the atmosphere through one stack (Stack #1).

11. Is the air contaminant source(s) in a nonattainment area? If "Yes", then minor source BACT must be addressed. Yes ☐ No ☑

12. Normal operation:	Hours/Day 24	Days/Week 7	Weeks/Year 52	Days/Year 365
13. Percent annual throughput	Dec. – Feb. 25	March – May 25	June – August 25	Sept. – Nov. 25

TYPE OF PERMIT REQUESTED (check appropriate box)

14. Operating permit ☐	Date construction started	Date completed	Date of ownership change (if applicable)
	Last permit number(s)	Emission Source Reference Number(s)	
Construction permit ☑	Last permit number(s) 726620	Emission Source Reference Number(s) 84-0124-01	

If you chose Construction permit above, then choose either New Construction, Modification, or Location Transfer

New Construction ☐	Starting date	Completion date
Modification ☑	Date modification started or will start Permit Issuance Date	Date completed or will complete TBD
Location Transfer ☐	Transfer date	Address of last location

15. Describe changes that have been made to this equipment or operation(s) since the last construction or operating permit application:

Change in feed stock as described above.

16. Comments

See associated applications APC101 and APC102 for more information.

SIGNATURE

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

17. Signature (application must be signed before it will be processed)	**Date**
Stephen Scott Digitally signed by Stephen Scott DN: cn=Stephen Scott, o, ou, email=stephen.scott@res-ses.com, c=US Date: 2020.01.13 11:30:04 -06'00'	01/13/2020

Signer's name (type or print)	**Title**	**Phone number with area code**
Stephen Scott	President	228-701-9996

DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL
William R. Snodgrass Tennessee Tower
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NON-TITLE V PERMIT APPLICATION
EMISSION POINT DESCRIPTION

Type or print and submit for each stack or air contaminant source. Submit with the APC 100.

GENERAL IDENTIFICATION AND DESCRIPTION

1. Organization's legal name and SOS control number [as registered with the TN Secretary of State (SOS)]
Volunteer Environmental Services, LLC #001059764

2. Unique Source ID (name/number/letter which uniquely identifies this air contaminant source, like Boiler #1)
Gasifier GS-200

3. Unique Emission Point ID (name/number/letter which uniquely identifies this emission point, like Stack #1)
Stack #1 (only one)

4. Brief description of air contaminant source (Attach a diagram if appropriate):
The thermal oxidizer accepts producer gas exiting the gasifier after passing through a cyclone and completely combusts the gas (<1500 degrees F, <2 second residence time). The flue gas then passes through two indirect heat exchangers which provide heat for a heated oil organic Rankine cycle generator . The outside air (non-flue gas) side of the second heat exchanger goes through a cyclone, then joins the flue gas and exits through the stack (Stack #1).

5. Emission point location	Latitude	Longitude	6. Distance to nearest property line (Ft.)
	35.620247	-89.611795	208'

STACK AND EMISSION DATA

7. Stack or emission point data: →	Height above grade (Ft.)	Diameter (Ft.)	Temperature (°F)	% of time over 125°F	Direction of exit (Up, down or horizontal)
	50'	24"	125-400	100	Up

Data at exit conditions: →	Flow (actual $Ft.^3$/Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/$Ft.^3$)	Moisture (Percent)
	2800-4000	19	40	5-7
Data at standard conditions: →	Flow (Dry std. $Ft.^3$/Min.)	Velocity (Ft. /Sec.)	Moisture (Grains/$Ft.^3$)	Moisture (Percent)
	2800-3000	15	40	5-7

8. Monitoring device and recording instrument (check all that apply):

Opacity monitor	SO_2 monitor	NO_x monitor	Strip chart	Electronic data logger	Other (specify in comments)	No monitor (none)
☐	☐	☐	☐	☐	☐	☑

9. Control device. Description of proposed monitoring, recordkeeping, and reporting to assure compliance with emission limits. Include operating parameters of control device (flow rate, temperature, pressure drop, etc.).
As specified by TN DEC regulations.

10. Air contaminants. Emission estimates for each air contaminant emitted from this point should be based on stack sampling results or engineering calculations. Calculations should be attached on a separate sheet. (see instructions for more details)

Air contaminants	Average Emissions (Lbs./Hr.)	Maximum Emissions (Lbs./Hr.)	Concen-tration	Average Emissions (Ton/Yr.)	Potential Emissions (Ton/Yr.)	Emissions Estimation Method Code *	Control Devices *	Control Effi-ciency %
Particulate matter (PM)			**					
Sulfur dioxide (SO_2)			***					
Carbon monoxide (CO)			PPM					
Volatile organic compounds (VOC)			PPM					
Nitrogen oxides (NO_X)			PPM					
Hydrogen fluoride (HF)								
Hydrogen chloride (HCl)								
Lead (Pb)								
Greenhouse gases (CO_2 equivalents)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Hazardous air pollutant (specify)								
Other (specify) Mercury								
Other (specify)								
Other (specify)								
Other (specify)								

11. Comments

Air contaminants to be determined by either computer model or system test.

SIGNATURE

If this form is being submitted at the same time as an APC 100 form, then a signature is not required on this form. Date this form regardless of whether a signature is provided. If this form is NOT being submitted at the same time as an APC 100 form, then a signature is required.

Based upon information and belief formed after a reasonable inquiry, I, as the responsible person of the above mentioned facility, certify that the information contained in this application is accurate and true to the best of my knowledge. As specified in TCA Section 39-16-702(a)(4), this declaration is made under penalty of perjury.

12. Signature	**Date**
Stephen Scott Digitally signed by Stephen Scott DN: cn=Stephen Scott, o, ou, email=stephen.scott@gns-aes.com, c=US Date: 2020.01.13 11:31:54 -06'00'	01/13/2020

Signer's name (type or print)	**Title**	**Phone number with area code**
Stephen Scott	President	228-701-9996

* Refer to the tables in the instructions for estimation method and control device codes.

** Exit gas particulate matter concentration units: Process – Grains/Dry Standard Ft^3 (70^0F), Wood fired boilers - Grains/Dry Standard Ft^3 (70^0F), all other boilers – Lbs. /Million BTU heat input.

*** Exit gas sulfur dioxide concentrations units: Process – PPM by volume, dry bases, and boilers – Lbs. /Million BTU heat input

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NON-TITLE V PERMIT APPLICATION
PROCESS OR FUEL BURNING SOURCE DESCRIPTION

Type or print. Submit with the APC 100.

GENERAL IDENTIFICATION AND DESCRIPTION

1. **Organization's legal name and SOS control number** [as registered with the TN Secretary of State (SOS)]	2. **Emission Source Reference Number**
Volunteer Environmental Services, LLC #001059764	84-0124-01

3. Is this air contaminant source subject to an NSPS or NESHAP rule? Yes ☐ No ☑
If Yes, list rule citation, including Part, Subpart, and applicable Sections:

4. **Unique Source ID** (see instructions)	5. **Unique Emission Point ID** (see instructions)
Gasifier GS-200	Stack #1 (only one)

6. Description of air contaminant source
Flue gas from a gasifier/thermal oxidizer process (Gasifier GS-200). The feedstock to the gasifier is 80-100% Medical waste and 0-20% Pharmaceutical waste. The fuel gas exiting the gasifier passes through a cyclone and then is fully oxidized in a thermal oxidizer (>1,500°F, <2 sec. residence time). Heat from the hot flue is extracted into hot oil, which is used drive an organic Rankine Cycle (ORC) electrical generator. The cooled flue gas then passes through a second heat exchanger where it is cooled to under 300°F before it is vented to the atmosphere through one stack (Stack #1).

7. Type of air contaminant source (Check only one option to the right)

Process Emission Source: For each process emission source, submit a separate application. (Check at right and complete lines 8, 9, and 14)	☑
Process Emission Source with in process fuel: Products of combustion contact materials heated. For each process emission source, submit a separate application. (Check at right and complete lines 8 through 14)	☐
Non-Process fuel burning source: Products of combustion do not contact materials heated. Complete this form for each boiler or fuel burner and complete a Non-Title V Emission Point Description Form (APC 101) for each stack. (Check at right and complete lines 10 through 14)	☐

PROCESS EMISSION SOURCE DESCRIPTION AND DATA

8. **Type of operation:** Continuous ☑ Batch ☐	Normal batch time	Normal batches/day

9. **Process material inputs and In-process solid fuels**	Diagram reference	Input rates (pounds/hour) Design	Actual
A. Medical Waste		5,333.34	5,333.34
B. Pharmaceutical Waste		1000	1000
C.			
D.			
E.			
F.			
G.			
Totals			

* A simple process flow diagram must be attached.

DESCRIPTION OF BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

10. Boiler or burner data: (Complete lines 10 through 14 using a separate form for each boiler, burner, etc.)

Serial Number	Type of firing***
	Thermal Oxidizer

Rated horsepower	Rated input capacity (10^6 BTU/Hr.)	Other rating (specify capacity and units)
	8	

Date constructed	Date manufactured	Date of last modification (explain in comments below)

** Source with a common stack will have the same stack number.

*** Cyclone, spreader (with or without reinjection), pulverized (wet or dry bottom, with or without reinjection), other stoker (specify type, hand fired, automatic, or other type (describe below in comments).

FUEL USED IN BOILER, BURNER, ENGINE, OR OTHER FUEL BURNING SOURCE

11. Fuel data: (Complete for a process emission source with in process fuel or a non-process fuel burning source)

Primary fuel type (specify) | Standby fuel type(s) (specify)

Fuels used	Annual usage	Hourly usage		% Sulfur	% Ash	BTU value of fuel		(For APC use only) SCC code
		Design	Average					
Natural gas:	10^6 Cu. Ft. 14	Cu. Ft. 8	Cu. Ft. 8	////////// //////////	///// /////	1,000		
#2 Fuel oil:	10^3 Gal.	Gal.	Gal.		///// /////			
#5 Fuel oil:	10^3 Gal.	Gal.	Gal.		///// /////			
#6 Fuel oil:	10^3 Gal.	Gal.	Gal.		///// /////			
Coal:	Tons	Lbs.	Lbs.					
Wood:	Tons	Lbs.	Lbs.	////////// //////////	///// /////			
Liquid propane:	10^3 Gal.	Gal.	Gal.	////////// //////////	///// /////	85,000		
Other (specify type & units): Producer Gas	2.2mcf	250	250	<1	<5	130		

12. If Wood is used as a fuel, specify types and estimate percent by weight of bark

NA

13. If Wood is used with other fuels, specify percent by weight of wood charged to the burner.

NA

14. Comments

This process gasifies the feed stock in one piece of equipment and transfers the resulting fuel gas (called producer gas) to a thermal oxidizer where it is fully combusted. The producer gas is injected into the oxidizer through a Remiz burner and the oxidizer operates at a minimum of 1,500 degrees fahrenheit and a residence time of at least 1 second. The hot flue gas passes through a heat exchanger that contains a circulating bath of heat transfer oil (liquid state only). The heated oil is pumped into an organic Rankin Cycle (ORC) electrical power generator.

For #9, the figures are based on 64 tons a day maximum input per permit. Medical waste and/or pharmaceutical waste totals will comply with the maximum input per permit of 64 tons per day. Pharmaceutical waste will be limited to no more than 1000 lbs per hour.

SIGNATURE

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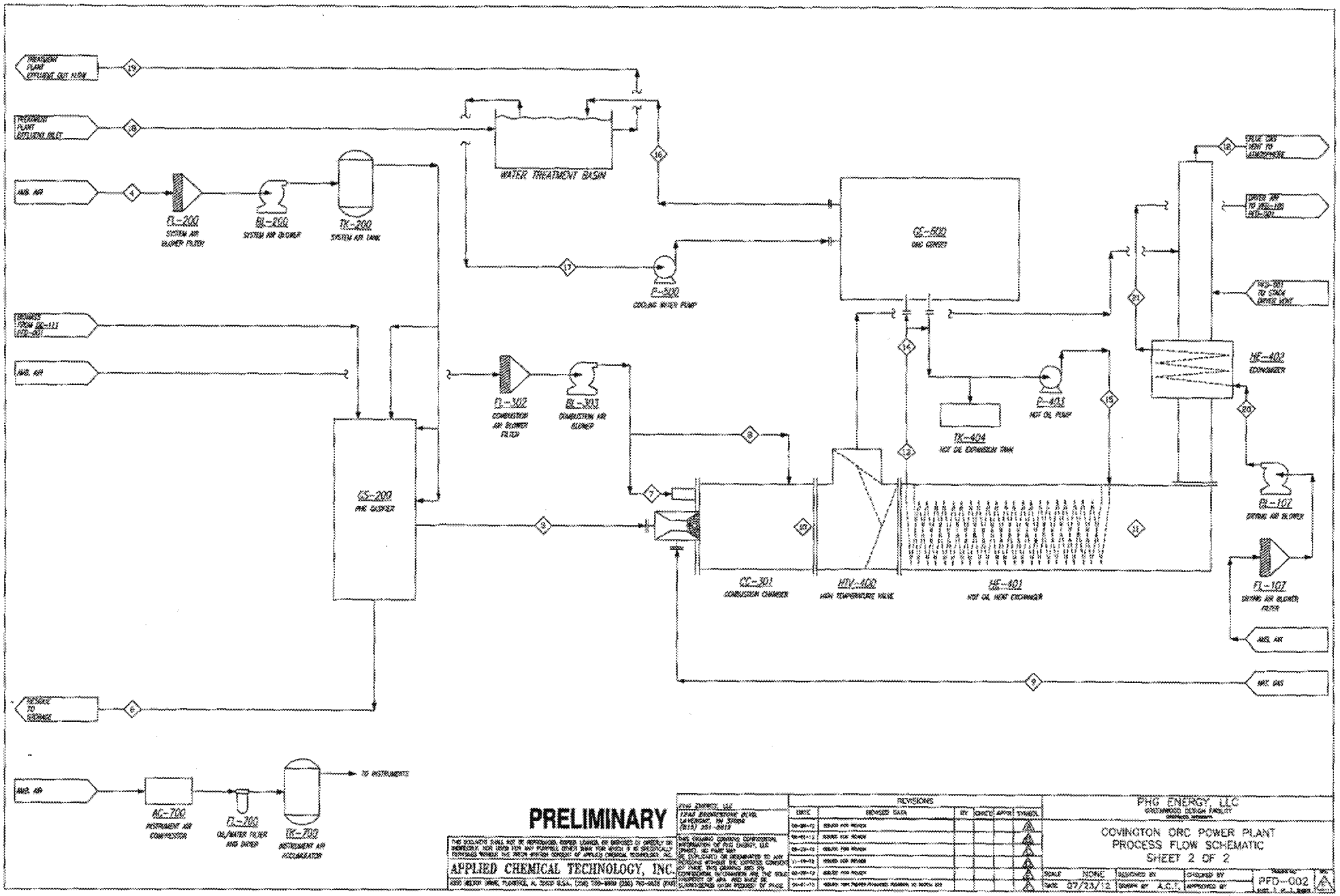
15. Signature		**Date**
Stephen Scott Digitally signed by Stephen Scott DN: cn=Stephen Scott, o, ou, email=stephen.scott@res-ees.com, c=US Date: 2020.01.13 11:31:10 -06'00'		01/13/2020
Signer's name (type or print)	**Title**	**Phone number with area code**
Stephen Scott	President	228-701-9996



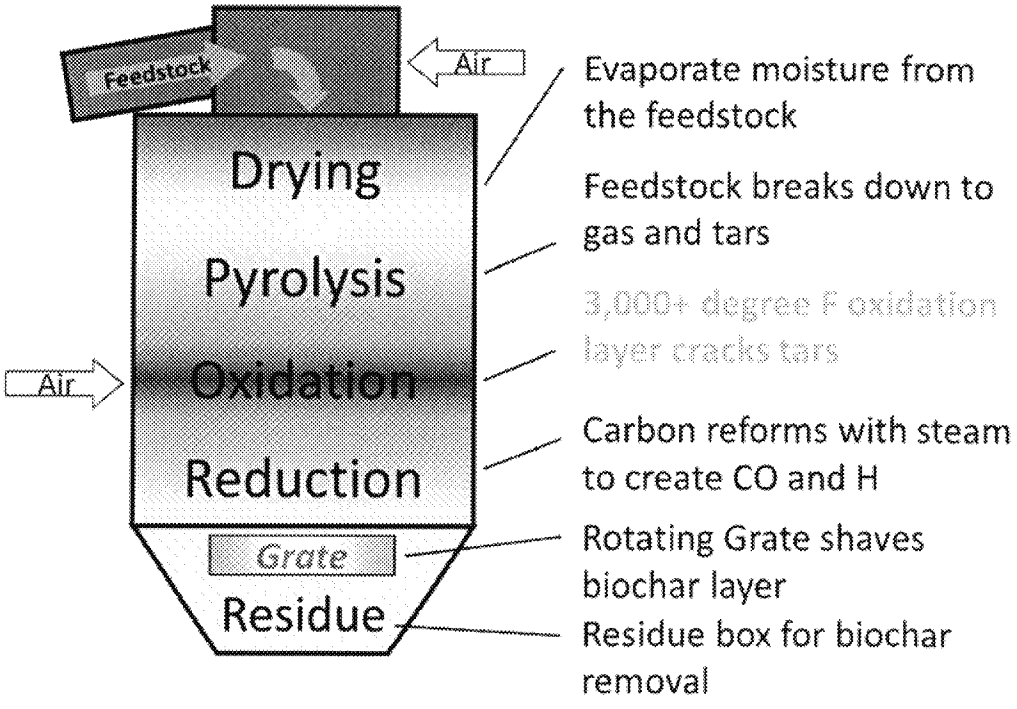
Attachment 1A

GASIFICATION PROCESS

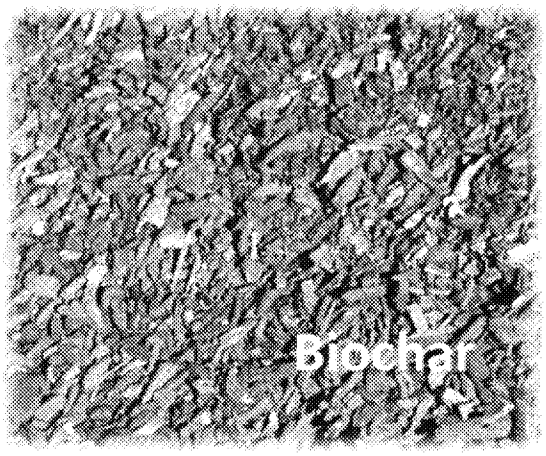
PHG GASIFIER SYSTEM DESIGN

PHGE has three gasifier models, including the PHG-8, PHG-12, and the PHG-LF. These gasifiers are state-of-the-art alternative fuel systems and utilize a proprietary downdraft design. The downdraft design also provides the highest conversion efficiencies possible in gasification technology at a low operating cost. To date, PHGE gasifiers have over 40,000 hours of combined commercial operation.

Organic biomass, or feedstock, such as urban wood waste, wood chips, and municipal solid waste is converted to a commodity called producer gas. The producer gas is generated through thermo-chemical processes called pyrolysis and partial oxidation. It is an extremely clean burning fuel characterized as a mixture of CO, CH_4 and H_2 that can easily and efficiently be used to supplement or replace natural gas, propane or fuel oil in thermal processes.



Biochar is a byproduct of the process and is comprised of the inorganic ash from the original feedstock as well as varying amounts of unreacted solid carbon. The biochar helps to produce a clean burning gas because the producer gas must pass through the biochar prior to exiting the PHGE reactor. Biochar production equals 3-5% of the feedstock mass entering the gasifier and has significant potential secondary value.

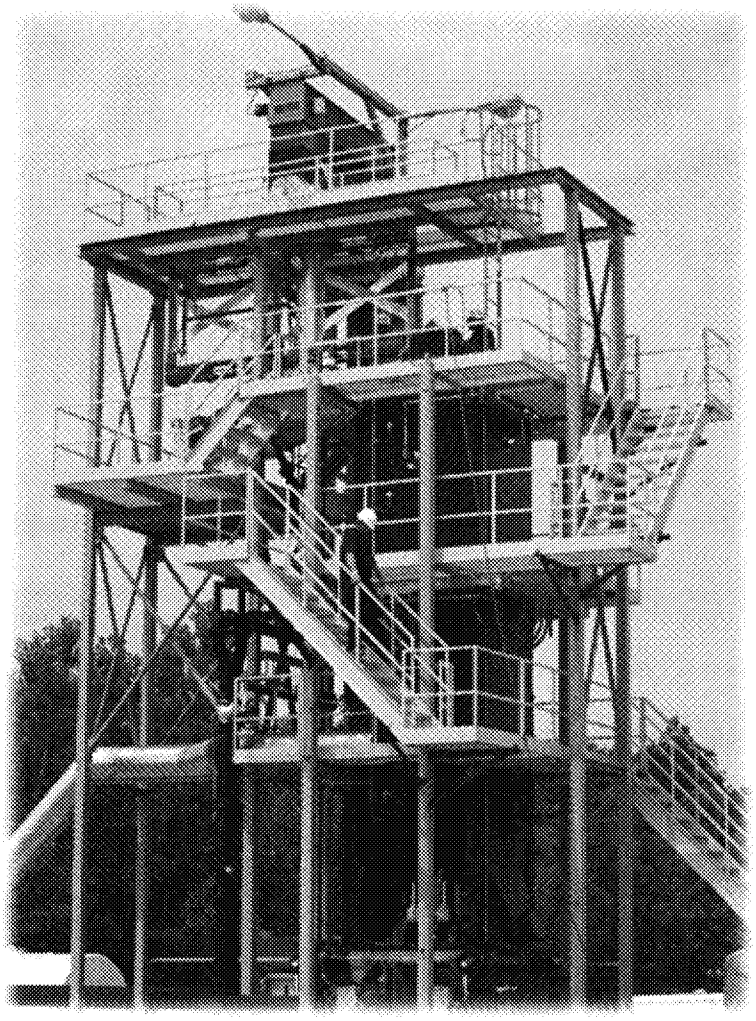


Gasification relies on a low-oxygen, intense-heat environment. In such conditions, instead of combusting completely, which would happen in an oxygen-rich environment such as open atmosphere, the biomass breaks down into simpler constituent molecules such as CH4, CO, and H2 that comprise the main combustible portion of the produced gas. The result is a gas that has not only cleaner-burning characteristics, but also a wider variety of applications than traditional biomass incineration.

The PHG system is a dynamic and versatile technology allowing the utilization of a wide assortment of differing biomasses; blending different biomass can further add to the versatility of the gasifier. Since 2005 many of these differing biomasses have been used successfully to generate producer gas, with testing of new biomasses continually being conducted. Among tested biomass materials are wood chips, urban wood waste, bark/hog fuel, tire derived fuel (blend), paper cubes, waste glycerol (blend), and cotton stalks. Each biomass is different, but PHG Energy can help determine the best blend for optimal performance and ease of system operation.

The gasifier can operate over a wide range of biomass parameters, including size distribution, moisture content, ash content and energy value. Additionally, other impurities like grit, sand, nails, or small metal scraps that might be associated with certain biomass types are not detrimental to the operation of the system. In most cases these impurities simply pass through the system and end up in the biochar or ash byproduct.

The PHG Energy biomass gasifier is a fully automated modular system designed for ease of installation, maintenance and operation. The standard scope of supply for the gasifier includes the inlet airlock, feed auger, gasifier reactor, gas exhaust horns, residue box and an integrated PLC-based control system.

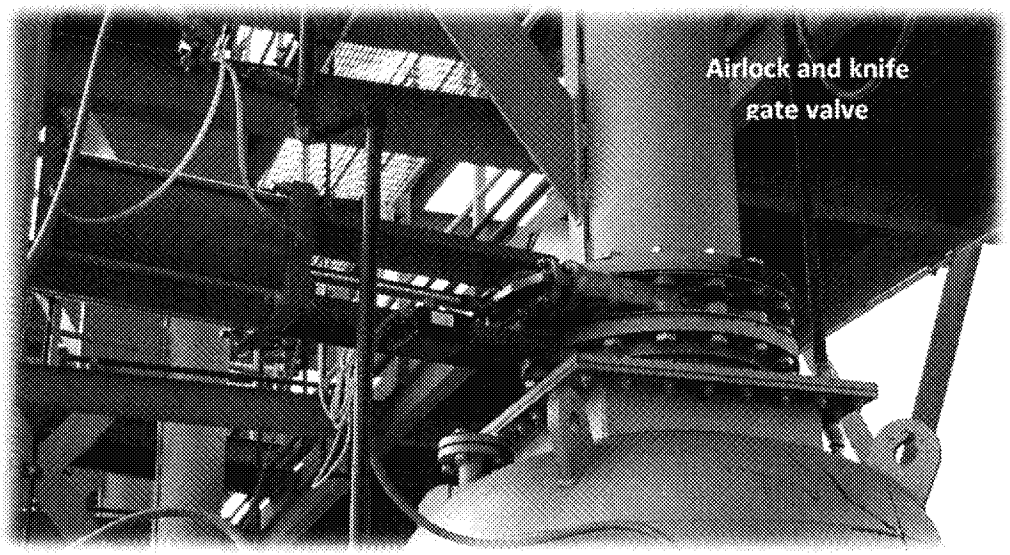


Large Format Gasifier – Greenwood, MS

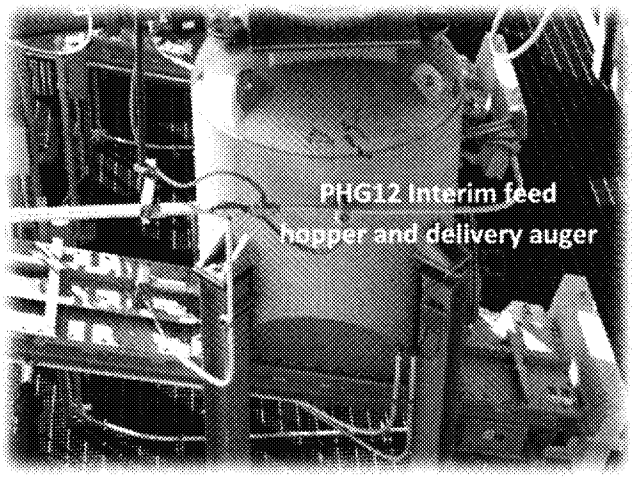
Airlock:

Biomass is first introduced into the PHG gasifier system through the airlock. The airlock is a pipe section at the top of the unit that has knife gate valves at the top and bottom. This two-valve arrangement provides a positive airlock into the system and allows biomass feeding while maintaining the positive pressure environment.

The heavy duty construction of the slide gate valves help to ensure reliable, long-term operation.



Feed Auger:



Feed stock is delivered from the airlock directly into the inclined auger to move the biomass into the top of the reactor housing. The offset of the interim hopper and inclined auger system prevents fugitive emissions from escaping as the slide gate valves operate.

Positive-pressure air is applied to the interim hopper to further prevent the escape of fugitive emissions.

Gasifier Module:

The PHG reactor is of industrial-grade construction; material thickness ranges from ½" to 1" mild steel fabrication. Internal to the reactor is over 3 tons of heavy duty silica carbide refractory insulation designed to retain the high temperature of the pyrolysis and oxidation reactions and also prevent loss of heat through the shell of the reactor.

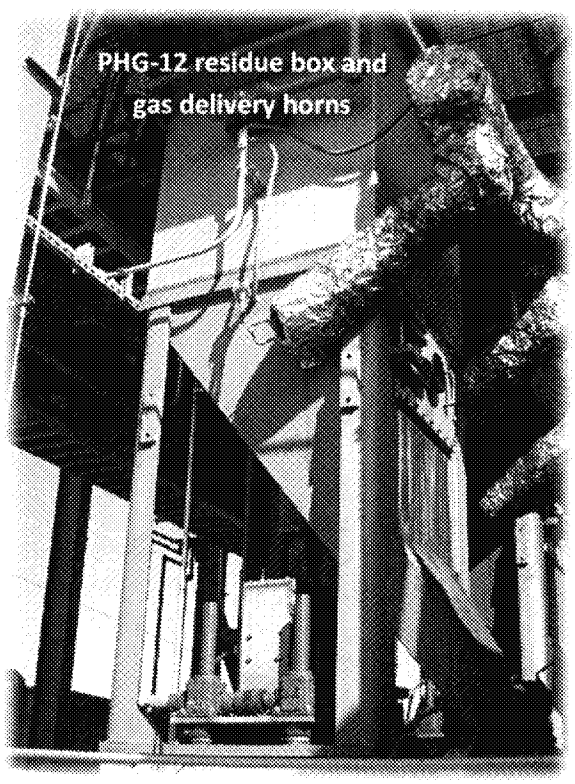
A rotating grate at the bottom of the gasifier supports the biomass/residue and grinds the biochar level to move the biomass and residue through the system. The rotating grate is supported by four jack screws underneath the residue box with a center shaft that connects the grate to the drive motor, allowing it to be tailored to the needs of the biomass being used.

Gas Horns:

The gas horns shown below are installed on each side of the residue box just below the rotating grate. Gas horns allow producer gas to exit the system in a uniform manner and help maintain a constant gas flow.

Residue Box:

Biochar, a byproduct of the pyrolysis reactions, is continuously collected in the residue box and exits the system through an auger/pocket valve arrangement. This seal maintains system pressure while providing a robust mechanism for continuous biochar removal from the pressurized environment.



Attachment 1B

COMBUSTION SYSTEM

PROCESS CONDITIONS

Producer gas entering burner
Flow = 1659 lb/hr
Composition – as supplied in project specs
Gas temperature entering – 1000F

Flue gas from combustor at 1500F operating temperature
Flow = 9748 lb/hr
Nominal composition

Component	mol%
CO2	6.82
H2O	10.67
N2	70.97
O2	11.55

COMBUSTOR

Because of the quantity of tars and particulate matter in the producer gas, we have designed the combustor for approx. 2 seconds residence time of the flue gas in the combustion chamber at the 1500F operating temperature. This sizing is 2x the normal sizing for a unit designed for 99.9% destruction efficiency, but the added residence time of the flue gas at operating temperature is necessary to insure destruction of the tar compounds and the carbon portion of the particulates.

Formal quote to ACT
Re: PHG Energy
12-10-12

The combustor is 6 ft. OD x 20 ft. long inside the chamber. The last 6 ft. of length is formed into an eccentric reducer that will have a nominal OD of 27", ID of 15" and a flange OD of 31" to match the diverter valve (by ACT) which is attached to the outlet of the combustor.

The combustor shell material is 3/8" carbon steel. The large flanges on the unit are ½" carbon steel. Standard support saddles, flame scanner connections, thermowell ports and an insulated 24" nominal diameter manway with davit are included.

Refractory is 3" of 3000F rated, 60% alumina gunned-on refractory as the hot face material and 3" of 2200F rated, 40% alumina gunned-on insulating refractory as the back-up layer. Suitable anchors are included as part of the refractory scope of supply. The refractory will be

shop installed and dried to 500F to eliminate all free water. At 1800F operating temperature, the combustor shell temperature calculates at 240F. At 1500F operating, the shell temperature calculates at 200F. An expanded metal personnel shield installed on 3" high stand-offs will be included for personnel protection.

BURNER

The burner is a UCC type DGR-5-SP dual gas burner designed to handle the producer gas and natural gas through the burner. The producer gas gun is an open ended 6" sch. 40, 304 SS pipe to allow the passage of the gas, tars and particulates without any obstruction that would cause build up of material inside the gas gun. The 6" pipe is externally insulated and mounted in an 8" pipe to minimize temperature loss of the gas in the pipe. The producer gas connection is a 6" 150RF flange which will be insulated with a removable flexible "boot" to further prevent gas temperature loss.

Producer gas firing rate is calculated at 4 MMBtu/hr and the burner is sized to handle up to 5 MMBtu/hr fired duty based on the nominal producer gas composition.

Burner block is 3000F rated refractory mounted in the burner mounting nozzle in the inlet end of the combustor.

Start-up and auxiliary gas firing tips are located around the I.D. of the burner block and have a single 1.5" NPT gas connection on the outside of the burner air housing. Burner is designed to deliver 4 MMBtu/hr with auxiliary gas firing. Turndown is 5 to 1 from design.

Pilot is an electric ignition gas fired pilot designed for pressurized gas and air supply to the pilot. Pilot is designed for a nominal 100,000 Btu/hr heat input on natural gas fuel. Pilot can be operated continuously or intermittently. Preferred gas flow and pressure is 100 scfh natural gas at 10 psig supply pressure. Preferred air flow and pressure is 900 scfh of plant air at 10 psig supply pressure.

Burner housing is carbon steel and all parts that handle the producer gas and/or are in the firing zone are 304/310 SS. Housing and all parts are designed for easy access for maintenance.

COMBUSTION AIR FAN

Fan is a Twin Cities type TBR-R25V, Arrangement 4, high pressure unit rated at 3400 scfm at 28" w.c. supply pressure. This flow and pressure represents 20% over design compared to the actual design requirement of the system.

The fan is a direct drive unit with a 40 HP, 3600 RPM, 460VAC, 3 phase motor. Motor is TEFC, set up for VFD control and electrically rated for Class 1, Div. 2 locations with Groups B, C and D atmospheres.

Fan is supplied complete with inlet and outlet flanged connections, shaft seals, drain with plug,

inlet venturi and bolted access door. An inlet silencer is included along with an inlet screen. With the silencer, the fan noise level is 85 dbA at 3 ft. from the inlet.

COMBUSTION CONTROL SYSTEM

Overall burner management system logic and auxiliary fuel gas valving is based on NFPA 86 guidelines which allow the system to be insured by IRI. System will include NEMA 4X panel enclosures, Allen-Bradley Contrologix Flex I/O base and will have sufficient I/O channels for connection SCADA system via Ethernet port. Control system will include sufficient capacity to control the hot oil system operation. The system panels and valving will be rack mounted on galvanized racks.

There are detailed operational issues which will require our co-ordination of the system design as the project moves forward.

EMISSIONS

For the design firing rate with either natural gas, producer gas or any combination of the two, the thermal NOx should be 0.5 lb/hr at the 1500F operating temperature and 0.6 lb/hr at the 1800F operating temperature. Fuel-created NOx due to nitrogen bearing compounds in the producer gas is based on a 25% conversion of the fuel bound nitrogen to NOx. This should amount to approximately 1.5 lb/hr.

CO emissions will be 0.04 lb/hr or less for any operating temperature above 1500F. Sox and Halogen emissions follow the dictum, "Pounds of sulfur/halogens entering will equal pounds of sulfur/halogens exiting".

Regulated Medical Waste

1. **Contaminated sharps waste** (e.g., needles, syringes with needles attached, scalpels, blood-contaminated broken glass, dental carpules with blood in them): "Sharps" are any objects that can puncture the skin.

2. **Pathological and anatomical waste:** These wastes are comprised of tissues, body parts, and organs removed during surgery or small amounts of tissue removed for study. Anatomical waste specifically refers to recognizable human organs and body parts.

3. **Microbiological waste:** Most commonly generated in laboratories, this waste consists of cultures, stocks, microorganisms, and biologicals. Any cultures or other items contaminated by this waste are also considered microbiological waste.

4. **Blood, blood products, and OPIM** (e.g., blood in blood tubes, blood or OPIM in suction canisters): Liquid blood and OPIM can typically be disposed of down the sanitary sewer.

5. **Contaminated items that would release blood or OPIM in a liquid or semi-liquid state if compressed** (e.g., blood-soaked gauze) and items that are caked with dried blood or OPIM and can release these materials during handling (e.g., blood-soaked gauze that has dried and the blood could flake off and bloody gloves or other items that have not absorbed the blood).

6. **Isolation waste:** Isolation wastes are wastes from patients infected with highly communicable diseases such as Ebola, Marburg, and other diseases listed in CDC Table 27. According to the CDC, they include biological waste and discarded materials contaminated with blood, excretion, exudates, or secretion from humans or animals who are isolated to protect others from highly communicable diseases.
   Unless patients are infected with one of these highly communicable diseases, their wastes are managed as other regulated medical waste. For example, if a patient is isolated for C. diff, MRSA, or VRE (not highly communicable infectious diseases according to CDC Table 27), all contact precautions are practiced according to CDC Isolation Precautions. However, the wastes are managed like any other medical waste.

Non-RCRA pharmaceutical waste accounts for about 85 percent of all hospital pharmacy inventory waste, and includes:

- U- and P-listed drugs in which the listed chemicals are not the sole active ingredient.
- Drugs listed as hazardous by the Occupational Safety and Health Administration (OSHA).
- Drugs categorized as carcinogenic by the U.S. Department of Health and Human Services National Toxicology Program.
- Drugs categorized as LD_{50} at or below 50 mg/kg.
- Any endocrine-disrupting compounds not already covered above.
- Any vitamin or mineral supplements that contain enough chromium, selenium or cadmium to fail the toxicity test or for which there is insufficient information to make a determination.

RCRA pharmaceutical waste – as updated by the EPA effective August 21, 2019

WASTE THAT WILL BE TREATED IN COVINGTON

A. Sharps
    a. Needles
    b. Syringes
    c. Ampules

B. Biohazard Waste
    a. Infectious waste
    b. Blood products
    c. Human tissue
    d. Cultures

C. Trace Chemo
    a. Vials and ampules
    b. IV's
    c. Tubing
    d. Gloves
    e. Gowns
    f. Aprons

D. Pharmaceuticals
    a. Medications
    b. Pills
    c. Antibiotics
    d. Injectables

THERE IS NO READIOACTIVE OR HAZARDOUS WASTED INCLUDED.

FURTHER CHEMICAL BREAKDOWNS ARE COMING.